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| 10/779,380      | 02/12/2004  | Alexander Starikov   | 110348-132026       | 8996             |

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| EXAMINER |
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| ART UNIT | PAPER NUMBER |
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3723

DATE MAILED: 06/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/779,380

Applicant(s)

STARIKOV ET AL.

Examiner

Bryan R Muller

Art Unit

3723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-14 and 16-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 6, 7, 9-11, 13, 14, 17, 18, and 22-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Aigner et al (Pub.No. 2002/0140148A1).

3. In reference to claim 1, Aigner discloses a substrate retainer comprising a plurality (paragraph 56 discloses that there may be several vacuum heads) of retainer bodies (12) configured to removably engage a substrate having a back side, wherein each retainer body engages a corresponding inner portion (the single vacuum head that is shown in the drawing is located in the center of the body, so the vacuum heads would thus, engage the inner portion of the substrate) of the back side and the plurality of retainer bodies collectively engage less than the entire back side (although only one is shown in the figures, even if several of the vacuum heads were present they would not engage the entire back side of the substrate) and a flexure (13) coupled to one of the retainer bodies, configured to restrict one or more degrees of movement of the substrate with respect to the substrate retainer (the flexure would inherently restrict movement in the X and Y planes that are parallel to the plane of the substrate and if the vacuum head is attached to the flexure, such as noted in claims 24 and 25 then the flexure would also restrict movement in the angular or  $\theta$  direction).

4. In reference to claim 2, Aigner further discloses that the retainer bodies (vacuum heads) removably engage the back side of the substrate through vacuum control.
5. In reference to claim 3, Aigner further discloses that the retainer bodies (vacuum heads) include a contact portion (15) and an aperture (10) extending through a portion of the contact surface to allow activation and deactivation of the vacuum.
6. In reference to claim 6, Aigner further discloses that the flexure is configured to allow out-of-plane movement (paragraph 54, lines 7-12) and the flexure would inherently resist in-plane lateral movement, as discussed supra.
7. In reference to claim 7, Aigner further discloses that the in-plane lateral movement restricted by the flexure is movement in the X, Y and  $\theta$  directions and the out-of-plane movement allowed by the flexure includes a Z direction, as discussed supra.
8. In reference to claim 9, Aigner does not disclose an actuator configured to controllably urge the flexure and the retainer body in an upward direction but there inherently must be a valve or controller that will act as an actuator to provide the negative pressure to the vacuum heads, which in turn will urge the flexure and retainer body upwards towards the substrate to facilitate chucking and dechucking of the substrate.
9. In reference to claim 10, the valve or controller that acts as an actuator, as discussed supra, will control the coupling of the retainer body to the back side of the substrate (see paragraph 23, lines 9-14).

10. In reference to claim 11, Aigner discloses a substrate confinement apparatus comprising a global confinement system that causes a substrate to substantially remain in one plane with a substrate retainer that includes a plurality of retainer bodies (12) configured to removably engage a substrate having a back side, wherein each retainer body engages a corresponding inner portion of the back side and the plurality of retainer bodies collectively engage less than the entire back side and a flexure (13) coupled to one of the retainer bodies and configured to restrict one or more degrees of movement of the substrate with respect to the substrate retainer, as discussed supra.

11. In reference to claim 13, Aigner further discloses that the retainer bodies (vacuum heads) removably engage the back side of the substrate through vacuum control.

12. In reference to claim 14, Aigner further discloses that the retainer bodies (vacuum heads) include a contact portion (15) and an aperture (10) extending through a portion of the contact surface to allow activation and deactivation of the vacuum.

13. In reference to claim 17, Aigner further discloses that the flexure is configured to allow out-of-plane movement (paragraph 54, lines 7-12) and the flexure would inherently resist in-plane lateral movement, as discussed supra.

14. In reference to claim 18, Aigner further discloses that the in-plane lateral movement restricted by the flexure is movement in the X, Y and  $\theta$  directions and the out-of-plane movement allowed by the flexure includes a Z direction, as discussed supra.

15. In reference to claim 22, Aigner further discloses that the apparatus may include several vacuum ports, as discussed supra, and air jets (paragraph 12, lines 14-18 disclose several individual nozzles which are supplied with a pressurized gas), both of which would inherently need a pressure control to operate, all working to maintain the substrate in substantially one plane.

16. In reference to claim 23, the confinement method using the substrate confinement apparatus of claim 11, would inherently comprise the steps of providing a substrate having process side and a back side, providing a substrate confinement apparatus having a substrate retainer, the substrate retainers including a plurality of retainer bodies (12) configured to removably engage a substrate having a back side, wherein each retainer body engages a corresponding inner portion of the back side and the plurality of retainer bodies collectively engage less than the entire back side and a flexure (13) coupled to one of the retainer bodies and configured to restrict one or more degrees of movement of the substrate with respect to the substrate retainer, positioning the substrate in the substrate confinement apparatus, urging one of the substrate retainers toward the back side of the substrate, and coupling a contact surface of one of the retainer bodies to the back side of the substrate, and activating a global confinement system.

17. In reference to claim 24, the steps of processing the substrate and decoupling the substrate retainer from the back side portion of the substrate would further be inherent when using the substrate confinement apparatus of claim 11.

18. In reference to claim 25, Aigner discloses that the step of urging one of the retainers towards the back side of the substrate includes providing an actuator and raising the actuator to engage the flexure. In this case the vacuum head (12) itself acts as the actuator and rises to engage the flexure when a vacuum is applied as shown in figures 10 and 11.

19. In reference to claim 26, Aigner further discloses that coupling the contact surface of one of the retainer bodies to the back side of the substrate includes supplying a vacuum to the retainer body.

20. In reference to claim 27, Aigner discloses that it is possible to remove the actuator (12) from the flexure (13) because the vacuum head sits with an edge flange (14) on a flexible foil (13, flexure), and would thus be easily removed for maintenance or replacement.

### ***Claim Rejections - 35 USC § 103***

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aigner et al (Pub.No. 2002/0140148A1) in view of Gleason et al (6,390,904).

23. Aigner discloses the substrate retainer and substrate confinement apparatus as discussed supra but fails to disclose that the contact surfaces are faced with a wear

resistant material. Gleason teaches that it is preferred to make substrate retainers that restrict lateral movement of substrates during polishing out of wear resistant materials (col. 1, lines 7-10) that preserve the integrity of the polishing pad (col. 2, lines 16-20) and protect the substrate from damage (col. 2, lines 26-30). Gleason also teaches that common wear resistant materials may scratch or chip the substrate so it would be advantageous to provide a liner or insert to the wear resistant material that would prevent damage to the substrate and maintain the wear resistant characteristics of the contact surface (col. 6, lines 49-58). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to provide face the contact surfaces of the substrate retainer and substrate confinement apparatus' of Aigner with a wear resistant material and a liner that will maintain the wear resistant properties and protect the substrates from damage in order to avoid damage of substrates and polishing pads during processing, and to maintain the integrity of the polishing pads. This would minimize unnecessary costs associated with replacing damaged polishing pads or substrates.

24. Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aigner et al (Pub.No. 2002/0140148A1).

25. Aigner discloses that the flexure is a flexible foil material but fails to particularly disclose what type of material it is made of but the definition of foil is A thin, flexible leaf or



sheet of metal;<sup>1</sup> so it would be obvious to one of ordinary skill in the art at the time the invention was made that the foil will be a metal material and the most commonly known foil is aluminum foil which is known to be cheap and readily available so it would further be obvious to use aluminum foil for the flexure.

26. Claims 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aigner et al (Pub.No. 2002/0140148A1) in view of Sinclair et al (6,494,769).

27. Again, Aigner discloses that the flexure is a flexible foil material but fails to particularly disclose what type of material it is made of and the definition of foil is A thin, flexible leaf or sheet of metal;<sup>2</sup> so it would have been obvious to one of ordinary skill in the art at the time the invention was made that the foil will be a metal material and Sinclair discloses a substrate retainer with a flexure coupled to the retainer body and teaches that the flexure is preferably made of spring steel (a flexible leaf or sheet of metal) because the spring steel has stiff yet resilient so it can act to connect the retainer body (ring) to the substrate retainer (wafer carrier mount) while allowing some vertical movement, as desired by Aigner, and the spring properties of the steel will return the retainer body to the retracted, unengaging position once the vacuum pressure is stopped (col. 8, lines 33-50). Therefore, it would have been obvious to one of ordinary

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skill in the art at the time the invention was made to make the flexible foil of Aigner out of spring steel, as taught by Sinclair.

28. Claims 12, 19, 21 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aigner et al (Pub.No. 2002/0140148A1) in view of Zuniga et al (6,210,255).

29. In reference to claim 12, Aigner discloses the holding means for a single substrate retainer but fails to disclose the number of retainers and orientation of the retainers in a polishing process. Zuniga ('255) discloses a typical polishing apparatus (20), that is also disclosed in several other inventions by Zuniga and others, that comprises four equilaterally spaced substrate retainers (100) so that each wafer can be picked up from a transfer station (27) and moved through three consecutive different polishing functions. This process creates an efficient and desirable finish for the wafers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide four of the substrate retainers of Aigner on a similar polishing apparatus such that they are equilaterally spaced to provide an efficient and desirable finish for the wafers, as taught by Zuniga and others.

30. In reference to claim 19, it would be obvious to provide the substrate retainers of Aigner on the typical polishing apparatus disclosed by Zuniga, as discussed supra, and Zuniga further discloses that each carrier head lowers a substrate into contact with a polishing pad (32) and holds the substrate against the polishing pad during the polishing

process (col. 4, lines 40-47), thus the apparatus maintains the substrate in generally one plane (XY plane) and allows for independent out-of-plane movement of the substrate in the Z direction.

31. In reference to claim 21, the typical polishing apparatus disclosed by Zuniga can lower or raise the substrate retainers in order to facilitate loading and unloading of the substrate so the polishing apparatus inherently must have some type of actuator to provide the lowering and raising motions.

### ***Conclusion***

32. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chen et al (6,080,050) Wood (2,680,994), Solocombe (1,384,278), Powell et al (4,428,815) and Hatcher (1,408,594) all disclose vacuum retainers that comprise one or several retainer bodies with flexures that restrict motion and removably engage substrates through vacuum control. Chen et al (6,080,050), Zuniga et al (6,146,259 and 6,514,124 and 6,368,191), Gurudasamy et al (6,361,423) and Tang et al (6,855,043) all disclose the typical polishing apparatus similar to the one disclosed by Zuniga et al (6,210,255).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan R Muller whose telephone number is (571) 272-

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4489. The examiner can normally be reached on Monday thru Thursday and second Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph J Hail III can be reached on (571) 272-4485. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BRM *BRM*  
6/1/2005



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